

CLAIMS

What is claimed is:

1. A method for dynamically building a packet processing chain, comprising:
providing a plurality of packet processing elements;
5 for each of a first subset of elements, providing operations indications;
for each of a second subset of elements, providing expectations
indications; and
building the chain by combining elements to form the chain according to
a configuration requirement, a first element from the first subset executing in the
10 chain prior to a second element from the second subset, wherein the operations
indications of the first element satisfy the expectations indications of the second
element.
2. The method of Claim 1, wherein an expectation is that a predetermined field
holds a valid value.
- 15 3. The method of Claim 2, wherein the predetermined field holds a pointer to a
datagram start.
4. The method of Claim 2, wherein the predetermined field holds a pointer to a
network layer start.
5. The method of Claim 1, wherein an expectation is that a predetermined field is
20 aligned.
6. The method of Claim 1, wherein building the chain is performed in response to
any of the group consisting of power-up, modification to the configuration

requirement, and creation of a new configuration requirement.

7. The method of Claim 1, wherein the chain performs at least one encapsulation function.
8. The method of Claim 1, wherein the chain performs at least one decapsulation function.
9. The method of Claim 1, wherein the chain performs at least one service function.
10. The method of Claim 9, wherein a service function is input/output filtering.
11. The method of Claim 9, wherein a service function is network address translation.
12. The method of Claim 9, wherein a service function is compression.
13. The method of Claim 9, wherein a service function is encryption.
14. The method of Claim 1, wherein an expectation is that a predetermined encapsulation/decapsulation has been performed.
15. The method of Claim 1, wherein an expectation is that a predetermined encapsulation/decapsulation has not been performed.
16. The method of Claim 1, wherein an expectation is that a predetermined service function has been performed.

17. The method of Claim 1, wherein an expectation is that a predetermined service function has not been performed.
18. The method of Claim 1, further comprising:
5 assigning magic numbers to elements, the magic numbers being indicative of expectations/operations of an element, wherein a chain is built by ordering selected elements according to their respective magic numbers.
19. A packet routing system, comprising:
10 a plurality of packet processing elements, where each element provides indications of its expectations and its operations; and
a chain builder which builds a chain according to a configuration requirement by combining a subset of elements to form the chain, such that the operations indications of an element in the chain satisfy the expectations indications of a following element.
20. The system of Claim 19, wherein an expectation is that a predetermined field
15 holds a valid value.
21. The system of Claim 20, wherein the predetermined field holds a pointer to a datagram start.
22. The system of Claim 20, wherein the predetermined field holds a pointer to a network layer start.
- 20 23. The system of Claim 19, wherein an expectation is that a predetermined field is aligned.
24. The system of Claim 19, wherein the chain builder builds the chain responsive to

any of the group consisting of power-up, modification to the configuration requirement, and creation of a new configuration requirement.

25. The system of Claim 19, wherein the chain performs at least one encapsulation function.
- 5 26. The system of Claim 19, wherein the chain performs at least one decapsulation function.
27. The system of Claim 19, wherein the chain performs at least one service function.
28. The system of Claim 27, wherein a service function is input/output filtering.
- 10 29. The system of Claim 27, wherein a service function is network address translation.
30. The system of Claim 27, wherein a service function is compression.
31. The system of Claim 27, wherein a service function is encryption.
32. The system of Claim 19, wherein an expectation is that a predetermined
15 encapsulation/decapsulation has been performed.
33. The system of Claim 19, wherein an expectation is that a predetermined encapsulation/decapsulation has not been performed.
34. The system of Claim 19, wherein an expectation is that a predetermined service function has been performed.

35. The system of Claim 19, wherein an expectation is that a predetermined service function has not been performed.
36. The system of Claim 19 wherein magic numbers are assigned to elements, the magic numbers being indicative of expectations/operations of an element,
5 wherein a chain is built by ordering selected elements according to their respective magic numbers.
37. A packet routing system, comprising:
a plurality of packet processing means;
expectations indication means for at least one packet processing means;
10 operations indication means for at least one packet processing means;
and
means for building a chain comprising at least one of said packet processing means by combining a subset of said plurality of packet processing means, according to a configuration requirement, such that the operations of a
15 first element in the chain satisfy the expectations of a second element's in the chain.
38. A computer program product for use in a computer network router, the computer program product comprising a computer usable medium having computer readable program code means embodied in the medium for building a chain to
20 process a packet, the computer usable medium comprising:
computer readable program code means for providing a plurality of packet processing elements;
computer readable program code means for providing operations indications for each of a first subset of elements;
25 computer readable program code means for providing expectations indications for each of a second subset of elements; and

computer readable program code means for building the chain by combining elements according to a configuration requirement, a first element from the first subset executing in the chain prior to a second element from the second subset, wherein the operations indications of the first element satisfy the expectations indications of the second element.